3.0 Buildings Supported / Type of Support / Cable Layout

3.1 388 Greenwich St

- Onsite coverage
- Drawings can be found in the appendix.

3.2 390 Greenwich St

- Onsite coverage
- Drawings can be found in the appendix.

3.3 250 West St

- Onsite coverage
- Drawings can be found in the appendix.

3.4 333 West 34th St

- Onsite coverage
- Drawings can be found in the appendix.

3.5 140 58th Street Brooklyn Army Terminal

- Remote (Dispatch form 388 Greenwich)
- Drawings can be found in the appendix.

3.6 2 Journal Square Plaza

- Remote (Dispatch form 388 Greenwich)
- Drawings can be found in the appendix.

3.7 20 Broad Street (New York Stock Exchange)

- Remote (Dispatch form 388 Greenwich)
- Drawings can be found in the appendix.

3.8 86 Trinity Place (American Stock Exchange)

- Remote (Dispatch form 388 Greenwich)
- Drawings can be found in the appendix.

3.9 14 Wall St

- Remote (Dispatch form 388 Greenwich)
- Drawings can be found in the appendix.

3.10 111 Wall St

- Onsite coverage
- Drawings can be found in the appendix.

3.11 125 Broad St

- Onsite coverage
- Drawings can be found in the appendix.

3.12 700 Edwin L. Ward Sr Memorial Highway, Rutherford, NJ

- Onsite coverage
- Drawings can be found in the appendix.

3.13 NY Metro SOE

3.13.1 77 Water St (Remote dispatch from 390 Greenwich)

3.13.2 2 Tower Center East Brunswick, NJ (Remote dispatch from 388 Greenwich)

*Drawings can be found in the appendix.

4.0 Standards

4.1 TIA/EIA Wiring Standards & Common Pinouts

568A

- Pins 1,2 = Pr. 3 Pins 3,6 = Pr. 2 Pins 4,5 = Pr. 1 Pins 7,8 = Pr. 4

568B (Most commonly used)

- Pins 1,2 = Pr. 2 Pins 3,6 = Pr. 3 Pins 4,5 = Pr. 1 Pins 7,8 = Pr. 4

USOC (Telephone standard)

- Pins 4,5 = Pr. 1 Pins 3,6 = Pr. 2 Pins 2,7 = Pr. 3 Pins 1,8 = Pr. 4

Type 1

- IBM 4 wire shielded cabling standard. Most commonly used for token ring.

Ethernet

- Uses pins 1,2,3 & 6 on an RJ45 across CAT5 cable.

Token Ring

- Uses pins 3,4,5 & 6 on an RJ45 across at least CAT3 cable. It sometimes requires a DB9 media filter impedance matcher to RJ45.

RS232

- Standard for data communications equipment addressing signaling timing, function, and voltage issues between 2 terminals without a computer involved.

FDDI

- Fiber distributed data interface consisting of fiber that provides two-counter-rotating rings for redundancy.

T1/256K (Full or fractional combinations)

- Uses pins 1,2,4 & 5 across a 22-awg individually shielded wire on an RJ45.

T3

- Uses RG59 coax and terminates BNC.

OC3

- Uses fiber. Most commonly across single mode, but also across multi-mode terminating in SC or FC.

DSL

- Uses pins 4 &5 on an RJ45 across at least CAT3 cable.

56K

- Uses pins 1,2,7 & 8 on an RJ45 across at least CAT3 cable.

POTS

- Uses pins 4 & 5 across at least Level1 cable.

ISDN

- Uses pins 4 & 5 across at least CAT3 cable.

Terminal Server pinouts and other modular db plugs

- Chart located in the appendix

4.2 Cable Specifications

Copper cable distances (CAT 5E)

Ethernet @ 10/100mbps

Link: 300ft of solid infrastructure.

Channel: 330ft of solid and stranded end-to-end infrastructure.

Patch cables are labeled at both ends from manufacturer with unique numbering schemes.

Token Ring @ 4/16mbps

Link: 300ft of solid infrastructure.

Channel: 330ft of solid and stranded end-to-end infrastructure

Type 1

Link: 300ft of solid infrastructure.

Channel: 330ft of solid and stranded end-to-end infrastructure

Fiber

Single Mode (SM)

One solid piece of glass, allowing for increased speed and less loss of light.

Multimode (MM)

Many individual strands of glass fused together.

Mode-conditioning

Fiber patch cables that fuse the multimode fiber into singlemode to utilize an existing MM infrastructure while achieving the benefits of SM fiber across a distribution frame.

62.5 micron

Diameter of the core of the strand of glass in a fiber. Multimode fiber used for all backbone network connectivity. It can accommodate connections up to 3,000 ft apart from each other at 100/FD and 1,650 ft apart from each other at 1000/FD.

50 micron

Diameter of the core of the strand of glass in a fiber. Multimode fiber used for SAN connectivity. It can accommodate connections up to1650ft apart from each other. The smaller diameter core has a smaller light gathering capacity.

9 micron

Diameter of the core of the strand of glass in a fiber. Single mode fiber used for LAN and WAN connectivity. It can accommodate connections up to 5km apart from each other. The smaller diameter core has a smaller light gathering capacity and laser based equipment is used as opposed to LED equipment used for multi-mode applications.

Simplex

Single strand of fiber.

Duplex

Dual strands of fiber.

4.3 Interface Types

F-connector

Coax cable termination head. It is identical to the kind you use for cable tv in your home.

BNC

Coax cable termination head. It has two knobs that interlock and twist on, to secure connections. It is most widely used in telecom applications requiring coax.

RJ45(RJ48)

Modular 8-pin remote jack used for network connectivity.

RJ11

Modular 4-pin remote jack used for phone lines.

RJ12

Modular 6-pin remote jack used for phone lines.

DB9/15/25

"D" shaped 9, 15, or 25 pin RS232 type connectors. Used for serial connections to other pc's, local printers, and terminal server console connections.

HD DB

"D" shaped connector whose pins are more densely packed to provide increased speed for data or video across cable.

ST

Round fiber connector used for MM or SM.

SC

Square fiber connector used for MM or SM.

FC

Round, threaded connector used for MM or SM.

MTRJ

Mini RJ type fiber connector that takes 2 strands of fiber into one connector for increased port density.

BICONIC

Older type of a threaded, screw-on fiber connector. It is a cross between FC and ST.

FDDI(MIC)

Duplex fiber connector head that requires a duplex cable and reverses transmit and receive automatically. Used in FDDI networks.

LC

Mini square fiber connector used for MM or SM.

ESCON

IBM termination head that has retractable connectors. It is used to connect to IBM type and mainframe devices.

4.4 Hardware Specifications

GBIC's / Attenuators

Gigabit Interface Cards. Attenuators are used in conjunction with them to accommodate db loss of great distances

SX

Used with MM fiber. Maximum distance is 1500ft.

LX/LH

Used with MM fiber when distance is between 150'-1000'. Used with SM or mode-conditioning cables, when the distance is <50' or >1000'. Maximum distance is 1650 feet.

ZX

Used over dark fiber. For distances less than 25km use a 10db attenuator. For distances between 25km and 50km use a 5db attenuator. Maximum distance is 70km.

Line cards

ST fiber 10mg: 12 port

SC fiber 100mg: 12 port

MTRJ fiber 100mg: 24 port

SUP I, II, III: Various fiber, copper, and operating ability supervisor cards for switches.

Copper 10mg: 24 port un-switchable

Copper 10/100mg: 24 or 48 port switchable

4.5 Redundancy Scenarios

Salt & Pepper

Provisioning of multiple redundant connections to a device from a pair of network switches or routers.

Fiber diversification

Separation of redundant trunk links by using different bundles of fiber infrastructure cabling to prevent an outage in the event one bundle is severed.

Connectivity diversification

Servers requiring multiple connections are salt and peppered across 2 switches and furthermore across different segments, and cards

4.6 Server Installations

UNIX HA Cluster

Typically requires 2 servers and 2 subsystems with a terminal concentrator. The cluster can be a –phys & -bkup scenario or have 2 active nodes. Servers connect at 100/fd on the same segment. Terminal concentrator connects at 10/hd.

NT Cluster

Typically consists of 2 servers and 2 subsystems with fiber arrays. All servers are dual-homed and set to 100/fd, all on the same segment.

NetApp Cluster

NAS that consists of 2 servers and 2 subsystems with fiber directly between each device.

Compaq

NT shelf and rack-mountable servers requiring keyboard, video, and mouse capability.

SUN

Shelf and Rack mountable Unix servers, requiring terminal server connectivity.

Term server requirement types

*Chart located in the appendix

*A sample cabinet elevation, mounting accessories, and infrastructure labeling format can be found in the appendix

4.7 Network Device Installation & ESD Prevention

Electrostatic Discharge (ESD) can be very costly to Citigroup. ESD is the transfer of electrical charge between two bodies of different potential. The same phenomenon that can create a shock when you walk across a carpet & touch a doorknob can potentially damage or ruin the electronic network equipment we install and support everyday. Unlike this scenario however, a shock doesn't necessarily have to occur to do damage to the equipment.

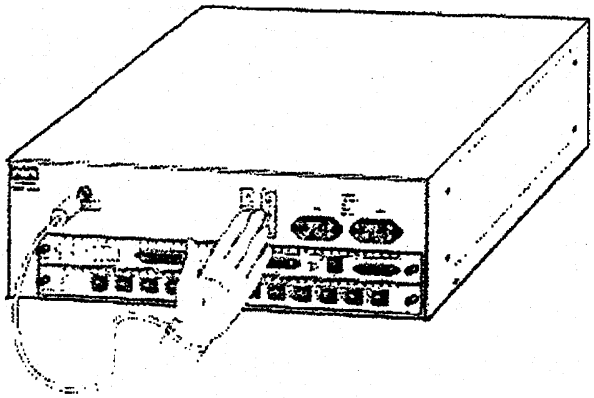
Electrostatic energy from friction can build up from common everyday activities including:

- Transporting non-Electrostatic shielding bag enclosed modules, components, or electronic boards either on a cart or by foot
- Walking across any type of floor
- Removing tape from a roll
- Handling a common plastic bag

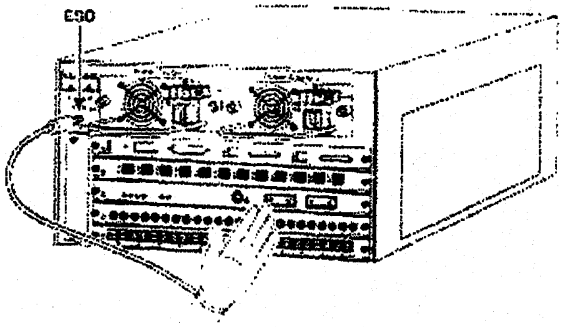
In order to protect our equipment from being inadvertently damaged by ESD, the following precautionary step should be taken when performing installations and support:

1) Electronic boards, modules, and components should never be stored or transported without the use of Electrostatic shielding bags.
2) Storage & installation of networking equipment & modules should always be done in environmentally controlled areas (Data Centers & IDF's)
3) Electronic boards, modules, and components should be handled only by edges when possible
4) Grounding wrist straps should be used whenever removing, installing, or coming in contact with sensitive modules or switch/router components. Straps are issued to all technicians & can also be found near or at the Data Center and IDF locations where networking devices are installed. The wrist strap should always be properly grounded to one of the following:

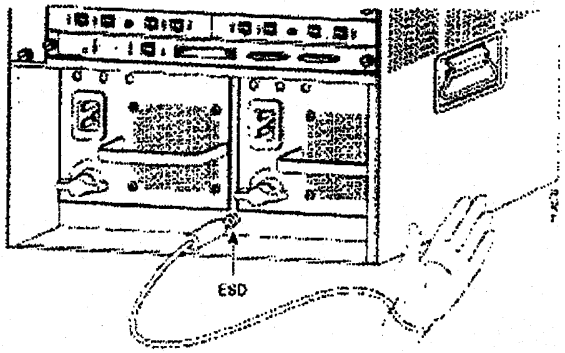
    - Captive installation screw on an installed module or power supply
    - Any unpainted surface on the chassis
    - Or ESD wrist strap connector location pictured in the following diagrams



Catalyst 5002 (w/175w)



Catalyst 5000 & 5505



Catalyst 5500, 5509, 6500, & 6509

Note: Avoid contact between modules & clothing. The wrist strap protects the module from ESD voltages on the body only. ESD voltages on clothing can still cause damage to equipment.

*Additional diagrams on our grounding system found in appendix

4.8 Probes

Network management devices that report on usage, traffic, and bandwidth, across backbone links.

Copper

Probes require management segment connectivity and have taps that serve as coupler and a splitter between the point-to-point connection. The taps provide an un-interrupted connection while allowing monitoring of the data traversing the link.

Fiber

Probes require management segment connectivity. Their taps can accommodate MM and SM fiber as well as mode-conditioning cables.

4.9 Encryptors

Devices that are put inline on a connection, along with probes if required, to encrypt and decrypt sensitive data across a WAN circuit.

T1/Frame

Uses V.35 to HD DB cabling to the CSU and router and an RJ45 connection for management connectivity.

T3

Uses HSSI to HSSI cabling to the CSU and router and an RJ45 connection for management connectivity.

*Drawings are located in the appendix

4.10 Testing & Troubleshooting Techniques

Loopbacks

Loopback plugs are made to test connectivity issues back to the device side. This is useful in determining hardware problems

Troubleshooting/Testing Techniques

All cabling that is installed is tested before it is turned over to the requestor. When troubleshooting a possible cable problem, the inter-connect path is verified by checking cable numbers and ports against the connectivity database and then tested using various equipment to certify the cable. If the problem persists, additional testers are used which assume the settings of the box and further help determine if the hardware, network or cable itself is bad.

5.0 DDC/IDF Access Procedure

5.1 DDC Access Review Procedure

Access

The Security system for the DDC's are on a fully automated platform consisting of cameras and card keys. These systems support DDC mantraps, access and exit doors, communication closets and floor access from elevators. Physical access to each of these zones is controlled by GSVC. GSVC is responsible for the physical security of these controlled spaces. Applications can be made for access by completing Distributed Data Center Access Request Form (DDCARF). The form can be obtained electronically from Network Integration by contacting Garfield Spence at: garfield.c.spence@citigroup.com. The form requests personal, company information as well as reason for access from the requestor. Requestor then submits to his manager for approval. Form is then forwarded to the Network Integration for review and overall approval. Authorized personnel must escort vendors and guests. Access will be granted after appropriate logbook entry.

Building Access will be reviewed on a monthly basis. The Tech Support Manager will receive the access list for all his areas of responsibility from building security each month.

This list contains the individuals that have previously approved access to the Tech Support area doors and entryways in addition to Telco closets and other areas that have telecommunications equipment residing in them. Tech Support management will review this list for accuracy. After the list is reviewed and the appropriate additions and deletions have been made, the Network Integration manager signs and stamps the documents and sends them to the security department for filing. A copy is then made and the lists posted by the entry way to each area.

Visitors

All visitors escorted into the Technical Support Area will sign in and out upon arriving and leaving. An authorized person is required to sign the log as authorization for entry. Additionally Management will review access logs for the area. See access logbook section.

5.2 388 TEL-KEY BOX PROCEDURES

Dual Control Lockbox

Communication closet keys are located in the 388 12th Floor old server room. The lockbox requires two keys for locking and unlocking. The key designated "A," is kept by the 388 Infrastructure supervisor and a deputy. Another designated Infrastructure staff keeps the other "B" key as well as a designated deputy. No individual is permitted to possess a copy of both an "A" key and a "B" key at any time. Spare copies will not be kept together in any location. "A" key holders may only keep spares of "A" keys; likewise, "B" key holders may only keep spares of "B" keys.

A logbook is maintained and entries made each time the lockbox is opened. It is the responsibility of the Infrastructure supervisor to verify the logs and complete a key reconciliation on a monthly basis. Any individuals present when the box is opened must have their names recorded in the log entry, and must sign the log at that time. The log must indicate the Trouble Ticket number obtained from the help desk, as well as record the details of the event or transaction necessitating the opening of the box. Entries should also be made verifying that no items are missing or show signs of tampering. When removing a key from the lockbox, both an individual having an "A" key and another individual having a "B" key must be present. The designated "A" key holder and the designated "B" key holder complete the sign-out log upon removing the key and enter the "Time Returned" section upon re-securing the key in the box.

A list of all authorized key holders is posted on or adjacent to the lockbox.

DISTRIBUTED DATA CENTER ACCESS REQUEST FORM

Personal Information

Card Number
Last Name
First Name
Middle Init

Company Information

Company Name
Office Phone
Site Location
Department
Card Number
Desk ID
Days Worked

388 Building Access
388 Sec Card#:
125 Building Access

12th Floor Server Room
12th Floor LAB
12th Floor PBX Room
Comm Room Access 1-15
Comm Room Access 16-27
Comm Room Access 28-39
125 All IDF's (Keys)
Gulf Insurance 7 & 8 Floor

390 Building Access
390 Sec Card #:

Hardware Maint. Room
390 - All IDF's
390 - IDF - 1st Floor
390 - IDF - 2nd Floor
390 - IDF - 3rd Floor
390 - IDF - 4th Floor
390 - IDF - 5th Floor
390 - IDF - 8th Floor
6th Floor Office Areas
6th Floor Test Lab
8th Floor Lan OPS Room
Infrastructure Lab
Freight Elevators - All Floors
Freight Elevators - 1-6
MTR Voice Recording
6th Floor Telco Room
8th Floor PBX Room
8th Floor Office Areas

34th Street Building Access
250 West Access

34th St. All IDF's
34th St. - Floors 1-5
34th St. - Floors 6-10
Basement - Training Rm
N34COMPROP
250 W ALL IDF's
250 W - IDF - Floors 2-6
250 W - IDF 7-11
250 W - 2nd Fl. Comm. Rm.
250 W - 5th Fl. Prod. Sup. Lab

Reason for Access

Department Mgr. Approval
Network Integration Approval

Issue a Temp Access
Date Expires
Date Updated

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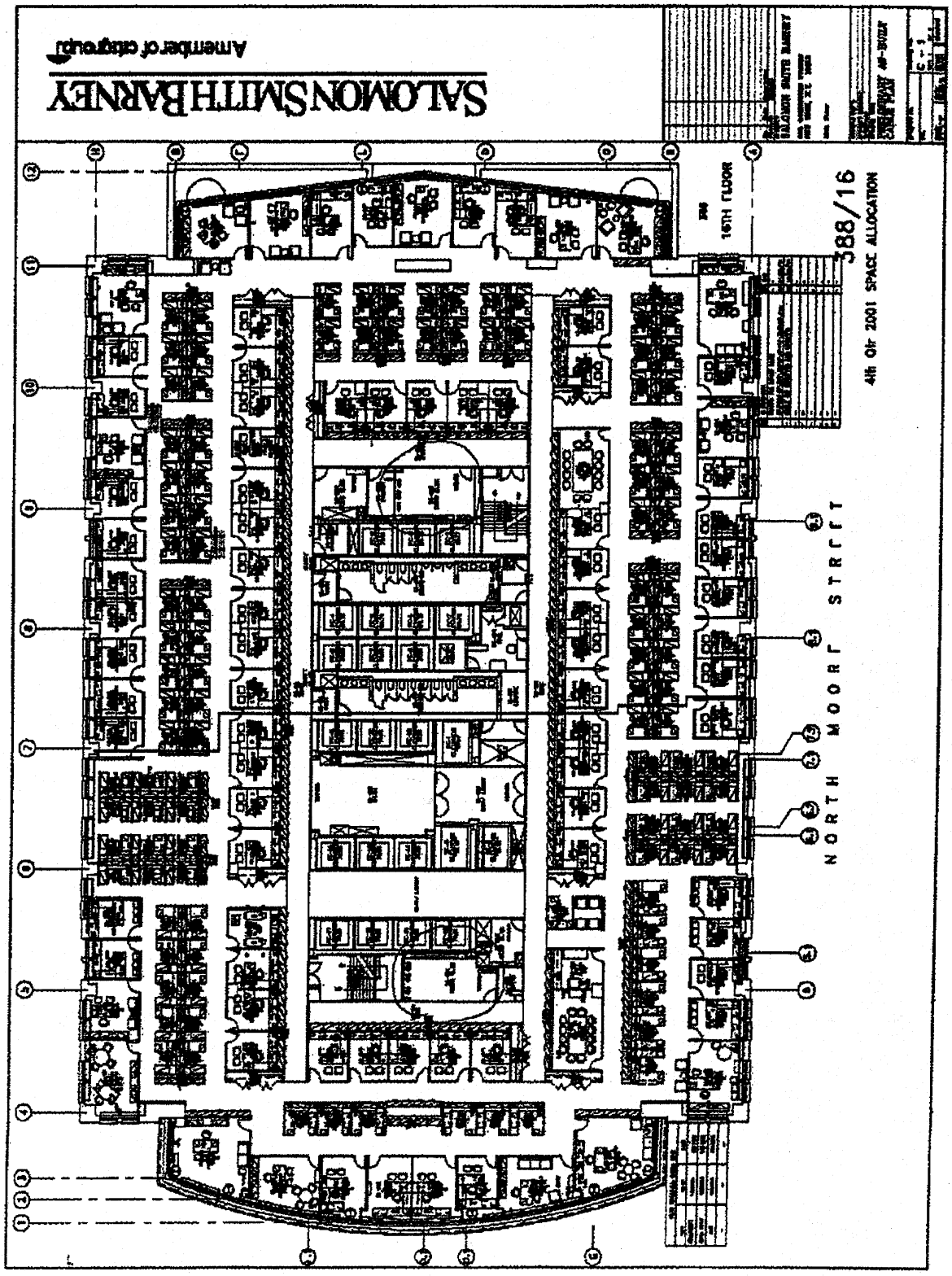
DDC VISITORS LOG

Date	Time In	Time Out	Visitors Name/Company (PRINT)	Reason for Visit	CTI Authorization

NAME	OFFICE #	BEEPER #	PIN#	BLDG	TITLE
DOUG JOHNSTON	2-3676	800-946-4644	1741114	ALL	SENIOR VP
GARFIELD SPENCE	2-3597	800-250-6323	9173231481	ALL	VP
388 Infra Hotline	6-2488				
390/8 DDC Hotline	5-4744				
TOM SARANELLO	6-4102	800-250-6323	69548	388/34/BAT	AVP
JOE DELGADO	6-9635	800-250-6323	9178025197	388/34/BAT	
CHRIS DEPINTO	6-0400	800-250-6323	9172408159	388/34/BAT	
BRYAN HAUGHTON	6-5955	800-250-6323	9174963790	388/34/BAT	
KENNY McMAHON	6-3864	800-250-6323	9172405206	388/34/BAT	
CARMELO MILLAN	6-1506	800-250-6323	9178204994	388/34/BAT	
BILL ODONNELL	3-9890	800-250-6323	9172053827	388/34/BAT	
NOEL VELEZ	6-6688	800-250-6323	9174010454	388/34/BAT	
JOHN WALTER	6-3331	800-250-6323	9172407111	388/34/BAT	
390 Infra Hotline	5-9288				
390/6 MTR Hotline	5-4804				
Ruth DDC Hotline	3-1000				
RICK BRAUNAGEL	5-5757	800-250-6323	399442	390/250/Ruth	AVP
KEVIN ALLEN	5-5428	800-800-7759	229429	390/250	
PETE AMODIO	201-231-2245	800-250-6323	9179047780	RUTHERFORD	
PHIL BRIGUGLIO	5-9035	800-250-6323	9172054812	390/250	
VICTOR FEKETE	3-3306			RUTHERFORD	
ANDREW FRANCIS	212-657-1557	800-250-6323	9172058112	111 WALL	
KEN HAAR	212-657-2188	800-250-6323	9172057649	111 WALL	
MATT HRADECKY	5-2710	800-759-4726	1150883	390/250	
TODD LICTHMANN	5-5921	800-759-8888	1151210	390/250	
ANDREW MOSS	2-2932	800-250-6323	9172053283	125	
FRANK TATULLI	5-5017	800-250-6323	9179049404	390/250	
WAN Integration Hotline	5-4969				
NORMAN BOWDEN	5-5215	800-250-6323	9172051655	390/250	
TOM LENTO	3-3246	800-250-6323	9173146501	ALL	AVP
STEVE TINKER	5-4638	800-250-6323	9179047978	ALL	
DataVox Hotline	5-5932				
VINNY MARGIOTTA	5-4715	800-800-7759	215792	ALL	
LOU FEOLA	5-4713	800-800-7759	247104	ALL	
RICH O'CONNELL	5-9022	800-800-7759	7889977	ALL	



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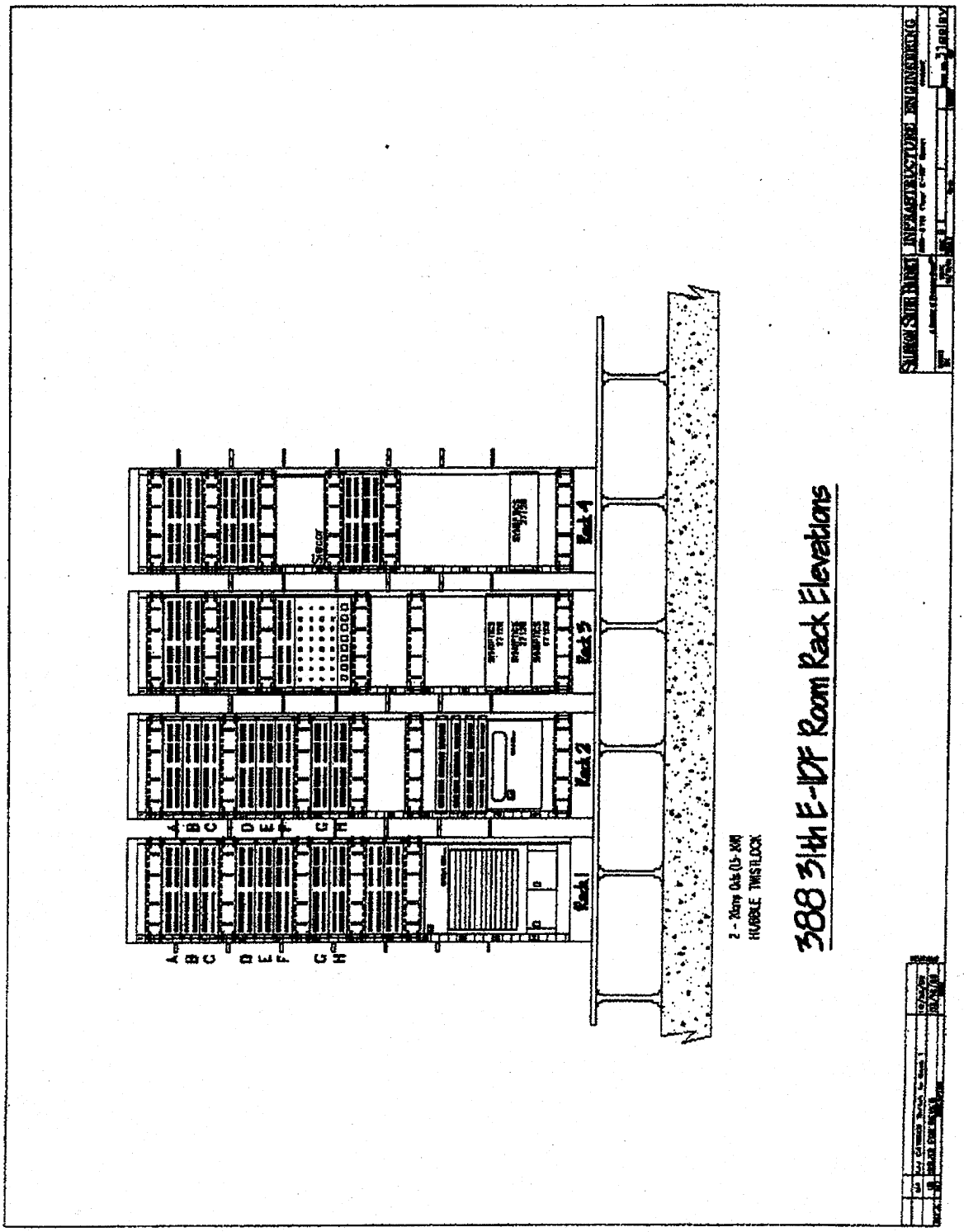

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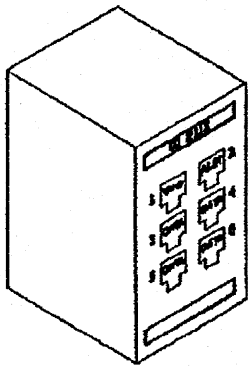

Floors 1 through 39 Surface Box Office/Cubicle Outlets:
Voice (Port 1) - Blue to 48S, Green to 3B6.
Aux (Port 2) - Orange to 48S, Brown 3B6.
Data (Port 3) - 568B wiring used.
Data (Port 4) - 568B wiring used.
Data (Port 5) - 568B wiring used.

Each row of 24 port patch panels is designated by a letter, beginning at panel position A and ending at F. This follows the IBM type 1 cabling standard.

Voice infrastructure is terminated at wallboard and is independent of the data ports found in the racks. (See telecom closet elevations for details).

OFFICE/CUBICLE OUTLET NOMENCLATURE:
XX XXXX
01 = Floor
E = Telecom closet where outlet terminates
1 = Rack number where outlet terminates
3 = Patch panel position where outlet terminates
2 = Outlet count for given office/cubicle area

Outlet Port Usage:
Port 1 = Voice, Port 2 = Aux, Port 3 = Data, Port 4 = Data,
D5 = Data, D6 = Blank

SALOMON SMITH BARNEY 388 Greenwich Street New York, NY 10013 Data Vox Technologies 2 Sector Street, 5th Floor New York, NY 10009 Phone: (212) 301-4300 http://www.datavox.com	**388 GREENWICH STREET** **DESKTOP WIRING CONFIGURATION**	ISSUED FOR: AS-BUILT REVISION: DATE: 12-05-2001 SCALE: DRG NO:

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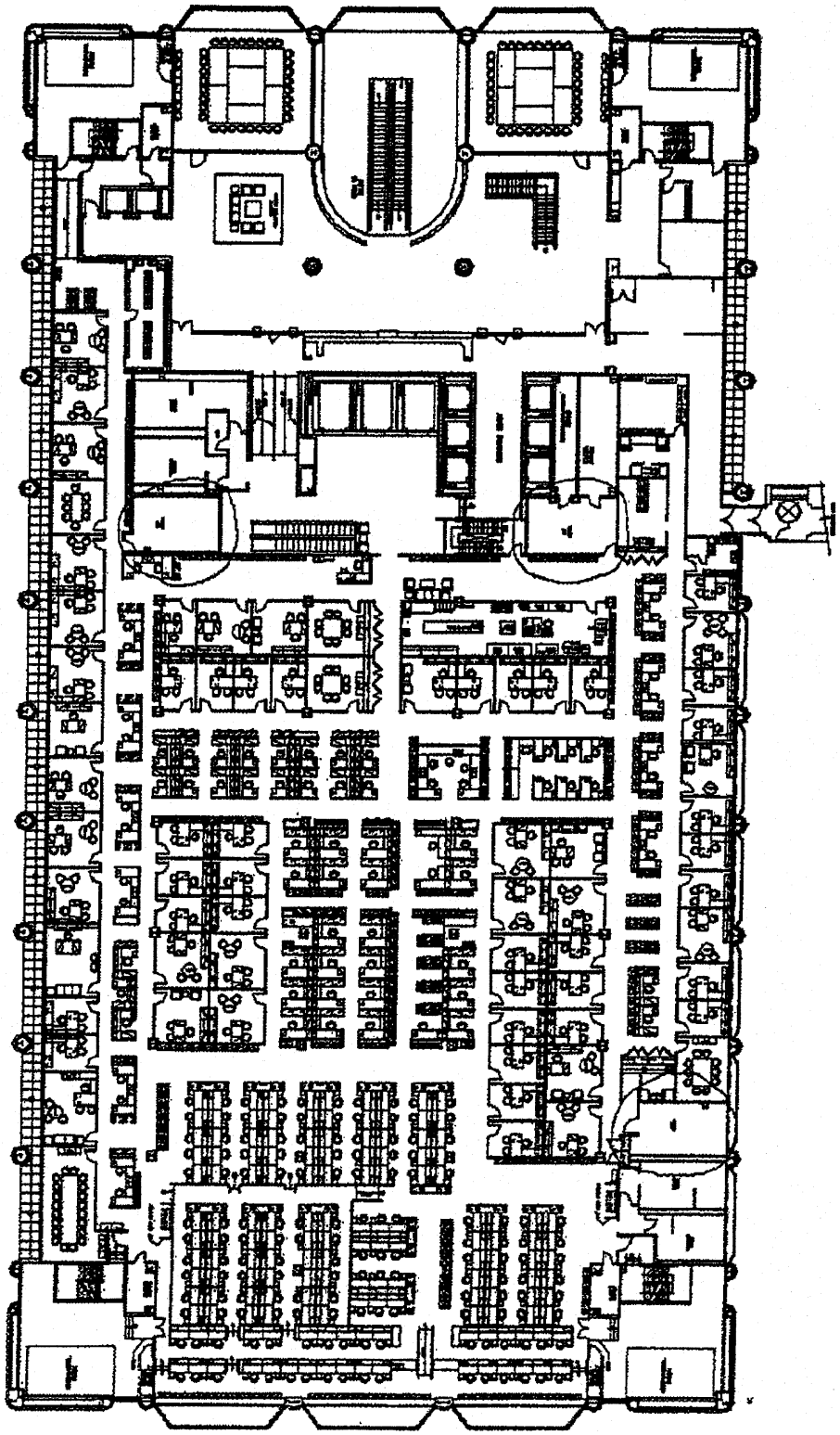

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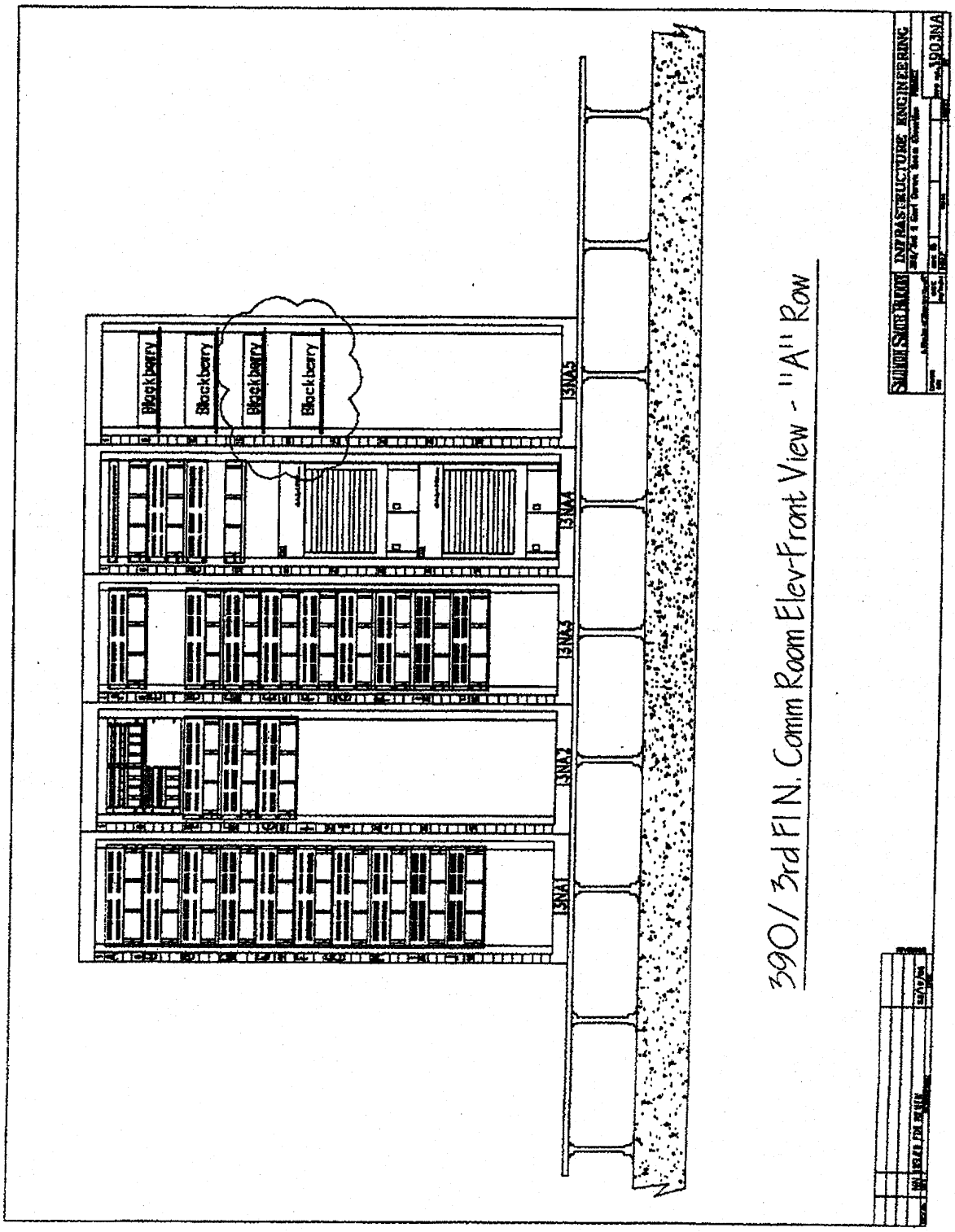

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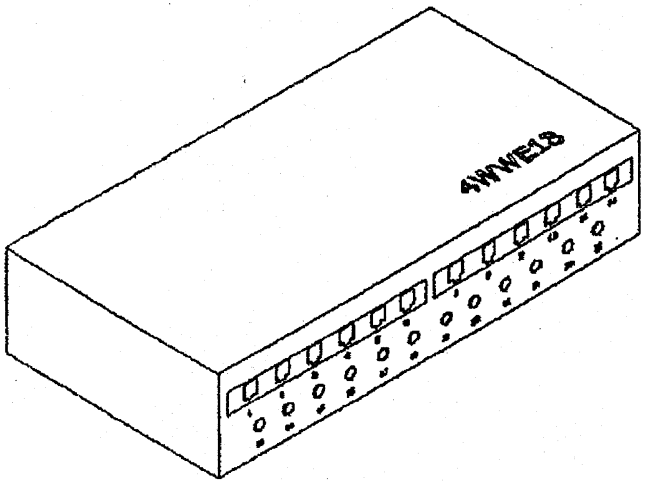


NOTES:

1, 2, 3 and 5 Trading Floor Techplates:
11 Cat.5 jacks wired. Jacks 1-9 are wired for 4 pair use, while jacks 10 and 11 share a Cat. 5 cable. Also, every other desk is wired with the above plus 12 strands of fiber.

4th Floor Trading Floor Techplates:
12 Cat.5 jacks wired for 4 pair use. Also, every other desk is wired with the above plus 12 strands of fiber.

OFFICE/CUBICLE OUTLET & TRADING DESK TECHPLATE NOMENCLATURE:

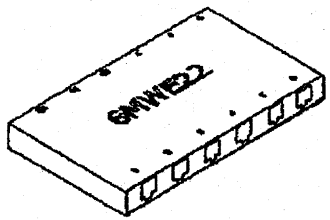
XXXXXX
6 = Floor
H = Riser shaft where outlet cabling passes
W = Telecom closet where outlet terminates
E = Office/cubicle zone where outlet is placed
22 = Outlet count for given office/cubicle area

WIRING STANDARD:

568B is used as the building wiring standard

Outlet Port Usage:

D1 = Voice, D2 = Fax/Modem/Polycom, D3 = Any,
D4 = Any, D5 = Any, D6 = Open Bloomberg, D7 = PC,
D8 = Unix, D9 = Printer, D10 = Any, D11= Fax/Modem,
D12 = Any



NOTES:

Floors 1, 2, 3 and 5 Office/Cubicle Outlets:
8 Cat.5 jacks wired for 4 pair use

4th Floor Office/Cubicle Outlets:
12 Cat.5 jacks wired for 4 pair use

6th Floor West Office/Cubicle Outlets:
6 Cat.5 jacks wired for 4 pair use

6th Floor East Office/Cubicle Outlets:
8 Cat.5 jacks wired for 4 pair use

7th & 8th Floor Office/Cubicle Outlets:
8 Cat.5 jacks wired for 4 pair use

CITIGROUP 390 Greenwich Street New York, NY 10013 DataVox Solutions 2 Rector Street, 8th Floor New York, NY 10006 Phone: (212) 301-4300 http://www.datavox.com	390 GREENWICH STREET DESKTOP WIRING CONFIGURATIONS	ISSUED FOR: AS-BUILT REVISION: DATE: 12-05-2001 SCALE: DWG. NO.

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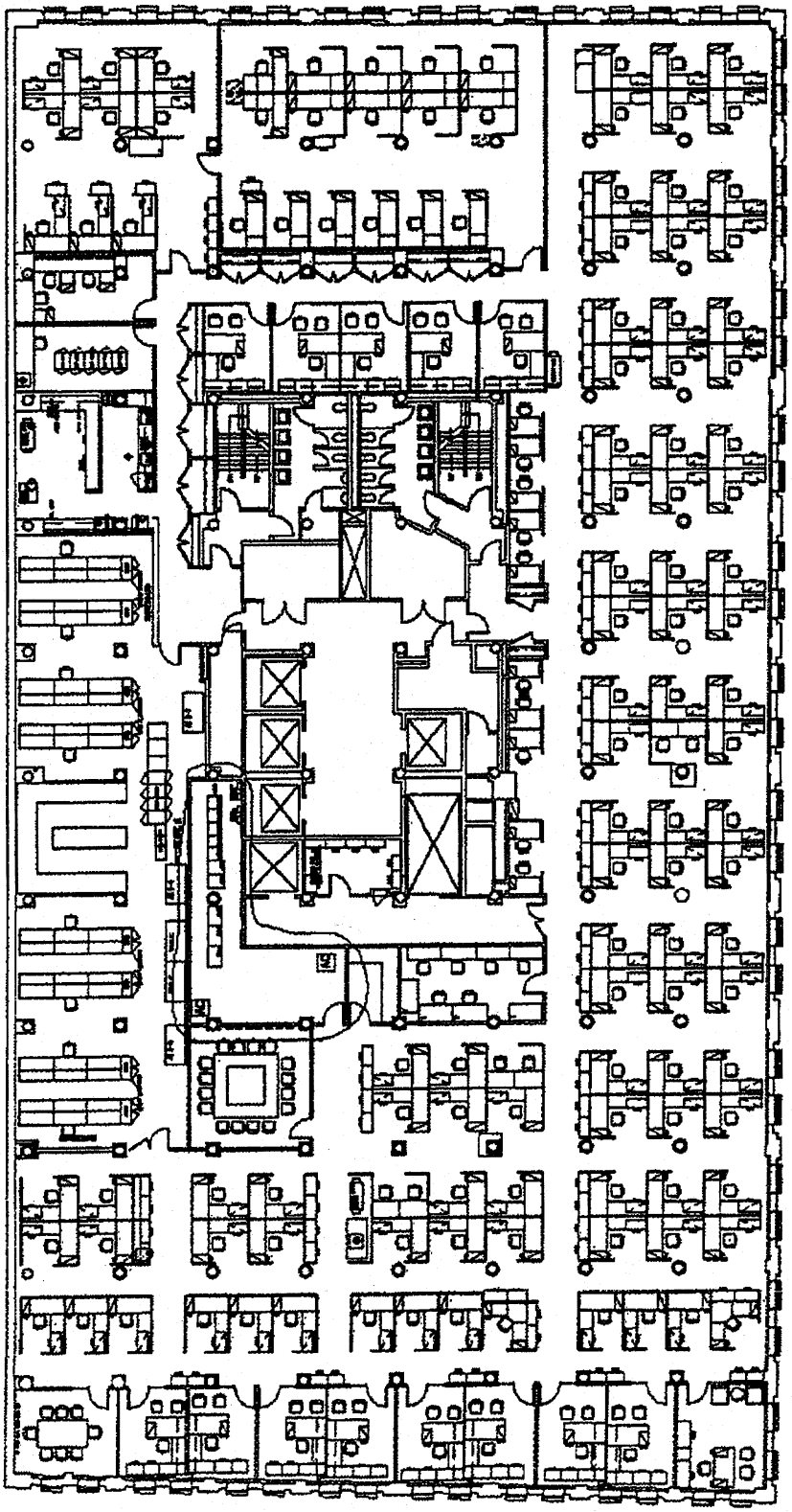

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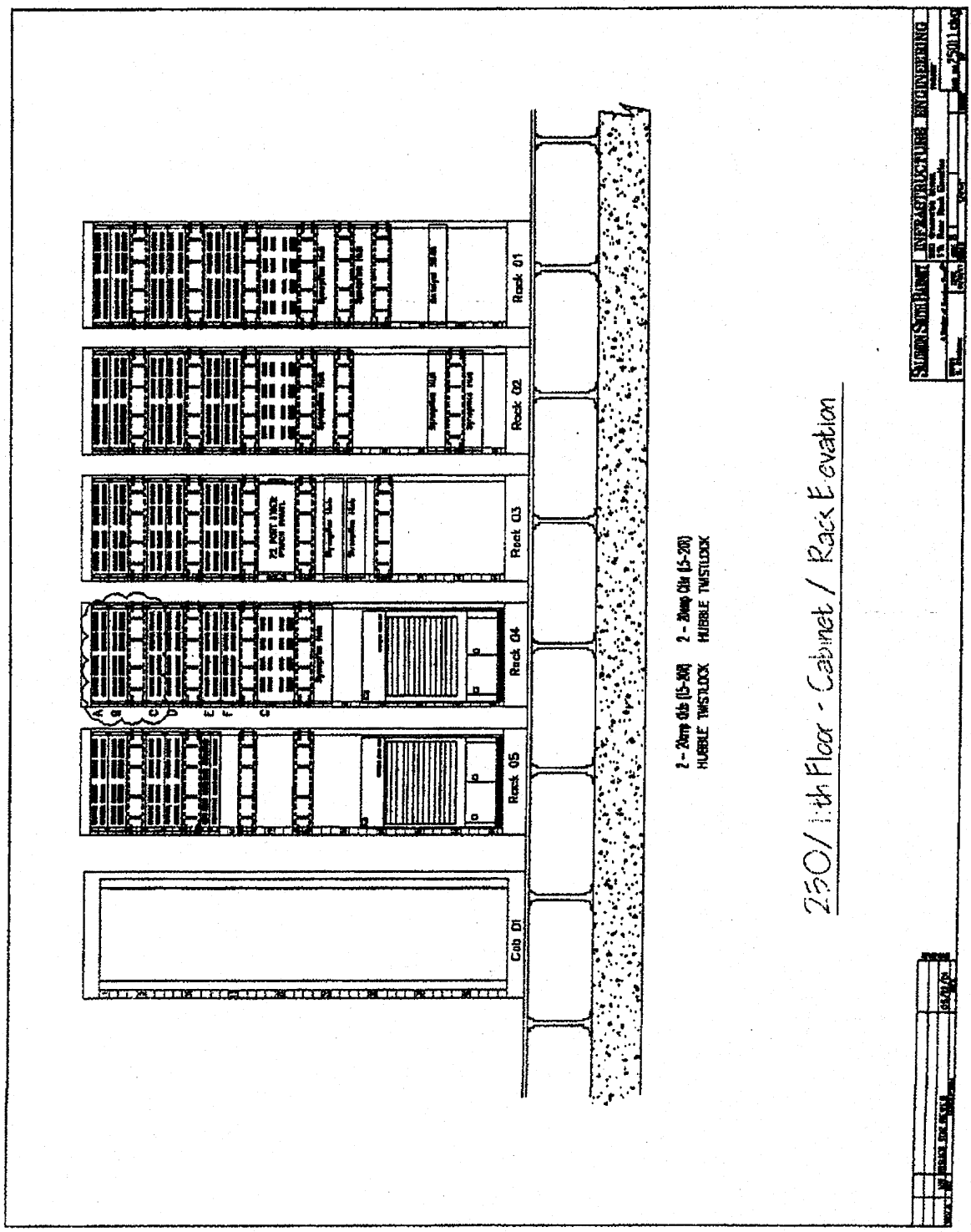

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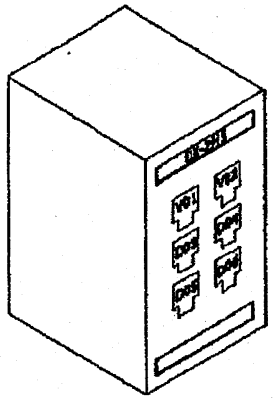

Floors 1 through 11 Office/Cubicle Outlets:
2 Voice jacks are CAT.5 wired for 4 pair use.
4 Data jacks are CAT.5 wired for 4 pair use.

OFFICE/CUBICLE OUTLET NOMENCLATURE:

XX-XXX
06 = Floor
2 = Rack number where outlet terminates
H = Patch panel position in rack where outlet terminates
5 = Outlet count for given office/cubicle area

WIRING STANDARD:

5e/6 is used as the building wiring standard

Outlet Port Usage:

V1 = Voice, V2 = Fax, D3 = Printer, D4 = Any,
D5 = Unix, D6 = PC

CITIGROUP 250 West Street New York, NY 10013 DataVox Solutions 2 Rector Street, 28 Floor New York, NY 10006 Phone: (212) 301-4300 http://www.datavox.com	**250 West Street** **DESKTOP WIRING CONFIGURATION**	ISSUED FOR: AS-BUILT REVISION: DATE: 12-05-2001 SCALE: DWG NO:

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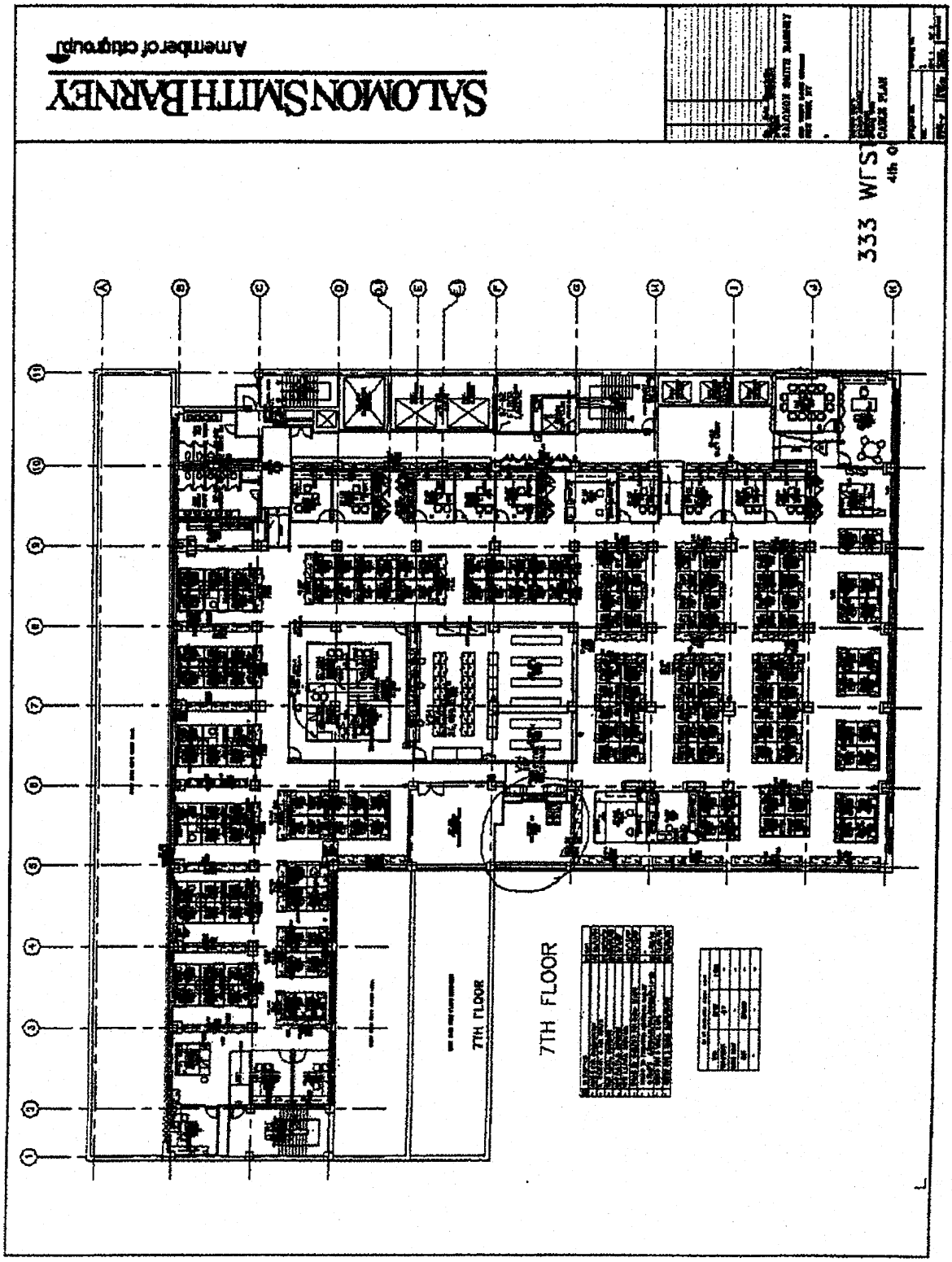

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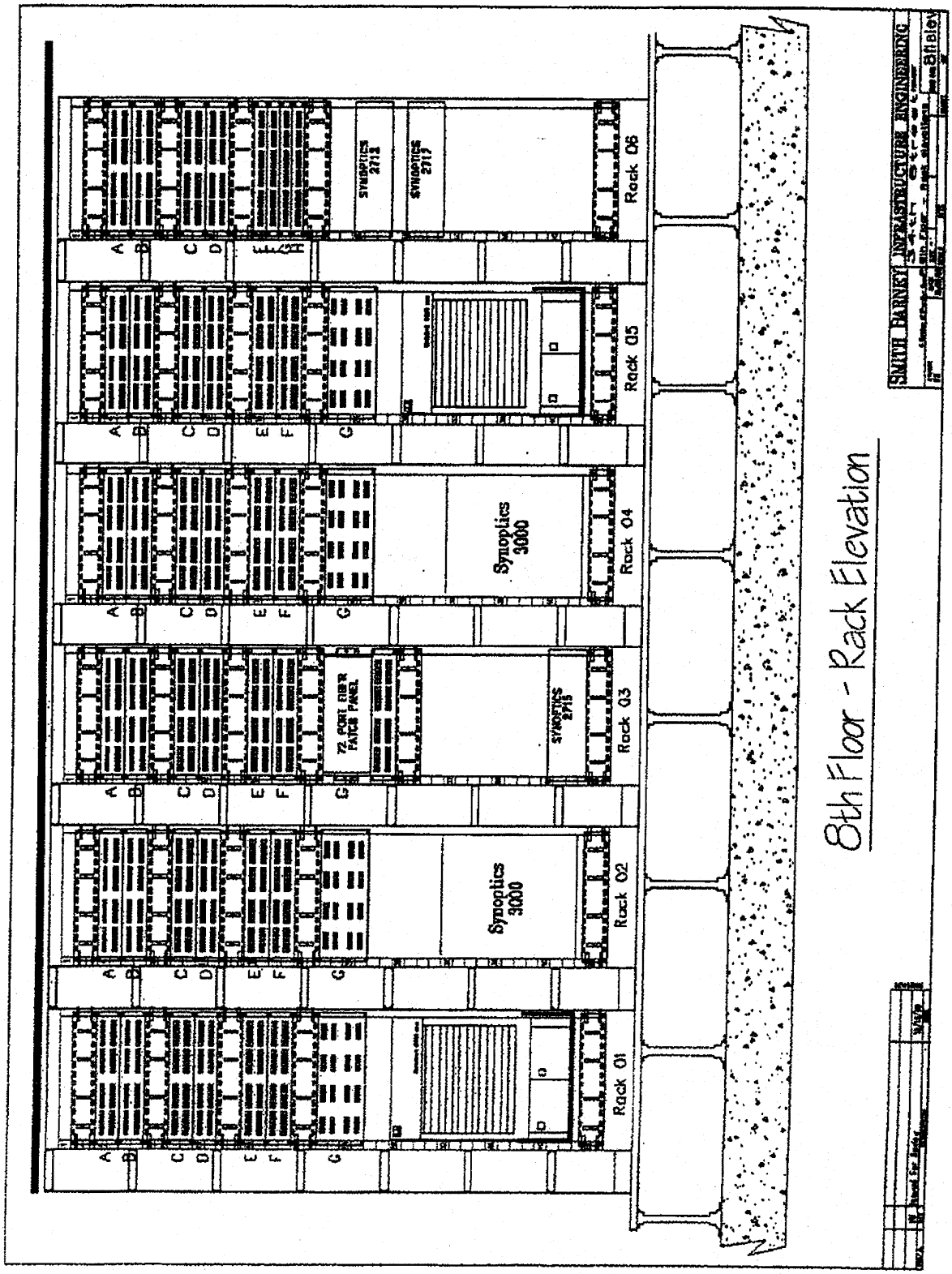

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